

- ✓ **High A-class penstock design**
based on DIN 19569-4 / BS 7775 / AWWA C 561
- ✓ **Fast and economic wall fixing**
pipe flange- and grouted fixing also possible
- ✓ **Simple civil construction - no cutouts**
therefore no concrete forming required
- ✓ **Sealing made of wastewater resistant Neoprene**
double-lip seal design for on- and off seating head
- ✓ **Sealing in bolted design**
therefore exchangeable
- ✓ **With slide bars for preload of sealing**
for the control of a individual flow through
- ✓ **Standard head 6 m for on-seating and off-seating**
higher head on demand
- ✓ **Door guided by rollers for bigger sizes**
provides easy opening, even in case of high operating head
- ✓ **All steel components of S.S. grade 304 or 316**
provides maximum resistance against corrosion, any special material is available

TESACO-Penstocks are designed for decades of operation even under the most extreme conditions. Should there be an exchange of the seals required, it could be done easily at installed penstock. Another special feature of the **TESACO**-Penstocks is the modular design. Through the addition of slide bars the standard isolation penstock is quickly upgraded to a control penstock for exact flow control. This could be upgraded at any time, even the penstock is installed already.

The operation could be carried out manually or electrically by electric actuators. These electric actuators could be equipped with various features and remote control units. In addition there are pneumatic and hydraulic lifting devices for the penstocks available.

TESACO-Penstocks consists of the following main components:

- Penstock frame: Wall fixing, pipe flange fixing or grouted fixing
MATERIAL: S.S. 304, 316Ti acc. DIN EN 10088-3;
OPTIONAL: any other special stainless steel alloy
- Penstock door: Sliding or rolling (depending from the nominal size)
MATERIAL: S.S. 304, 316Ti acc. DIN EN 10088-3;
OPTIONAL: any other special stainless steel alloy
- Door guides: With adjustable wedging for maximum of seal-effect
MATERIAL: S.S. 304, 316Ti acc. DIN EN 10088-3;
OPTIONAL: any other special stainless steel alloy
- Seals: Fixed on frame, exchangeable
MATERIAL: Rubber Neoprene acc. ISO 3302-1 E3
OPTIONAL: NBR, EPDM
- Spindle: Rolled thread in trapezoidal form, rising or non-rising
MATERIAL: S.S. 316 acc. DIN EN 10088-3
- Spindle nut: Located at the penstock door or above coping level
MATERIAL: Bronze CuSn12-C acc. DIN EN 1982
- Wall seal: Recommended Silicone for optimal compensation at uneven concrete walls
If requested we can also supply a EPDM seal
- Operating equipment: Manual, electric or pneumatic/hydraulic
MATERIAL and DESIGN: acc. to specification and manufactures advices
- Anchor bolts: Chemical anchor V, including capsule V-P
MATERIAL: S.S. 316

TESACO-Penstocks represent a heavy and reliable design combined with max. resistance against corrosion. Therefore they are optimal for installation in municipal and industrial wastewater treatment plants, sewers systems, pumping stations, retention reservoirs. There are different designs available for the application under conditions of highly aggressive industrial waste water. In case of marine water we have a special edition with components made of high quality marine water resistant stainless steel in addition with a cathodic protection.

Penstock design

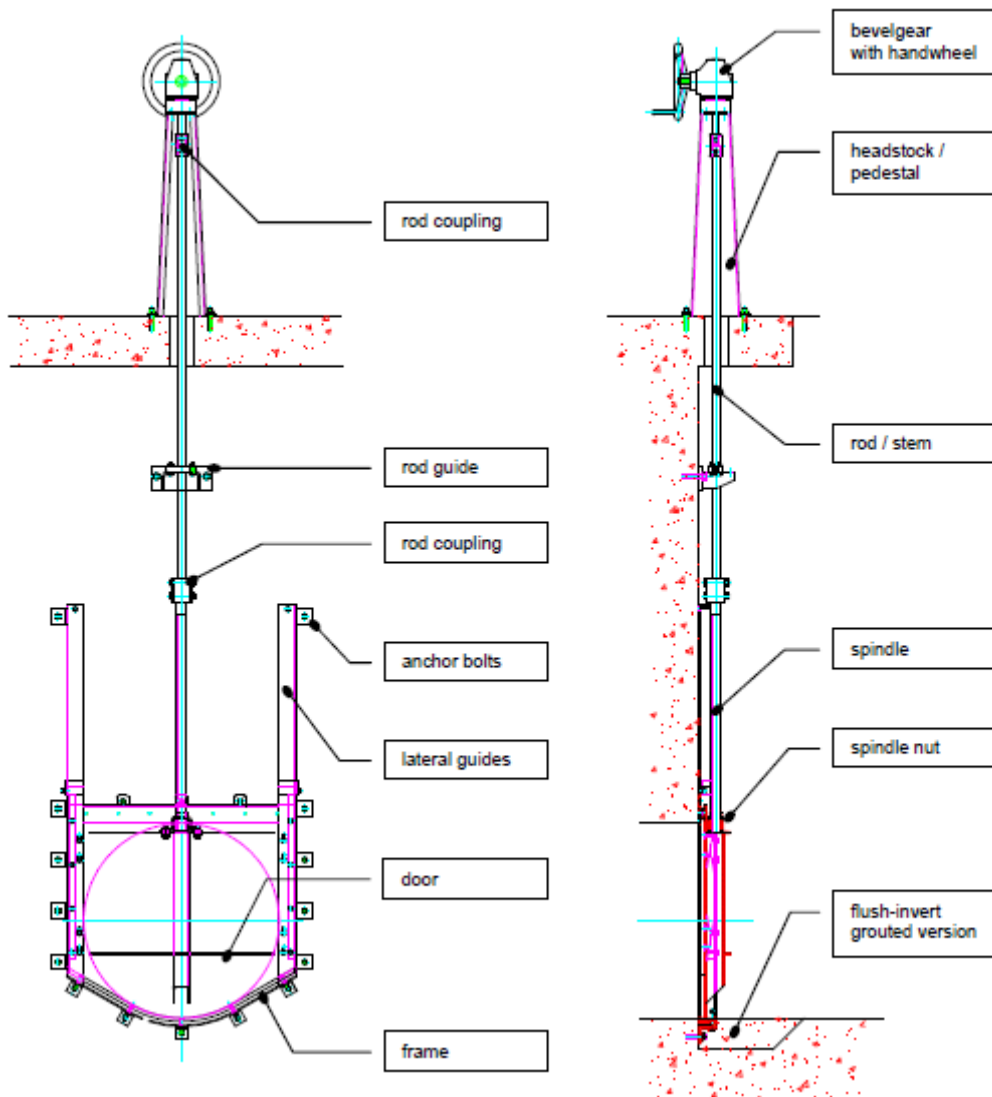


Fig. 1 - typical penstock configuration

Sealing Arrangement - Sectiones

Top sealing

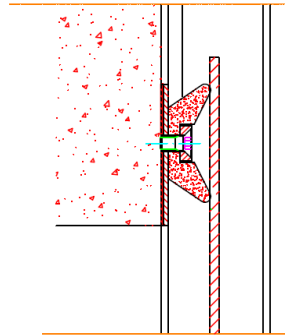


Fig. 2

Lateral sealing

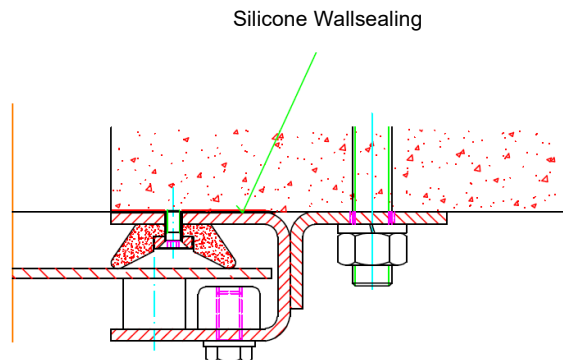


Fig. 3

Bottom Sealing

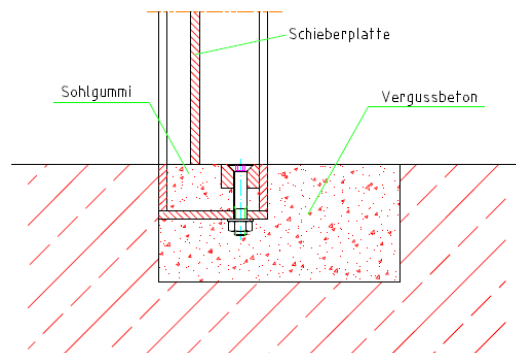


Fig. 4

Design details

Penstock frame:

The frame is a heavy, fabricated design. It could be easily fixed to a flat mating surface but also be grouted with shrink-free concrete. The well-proved double-lip sealing is bolted to the frame and could be exchanged at the installed penstock.

Penstock door:

Same as the frame, the door is also a heavy, fabricated design. The main plate is reinforced with ribs and designed for a max. water head of 6 m for the standard penstocks. Special designs are available up to a water head of 20 m.

Function of rollers and wedges:

All penstocks are equipped with an adjustable wedging system. Depending from the size and operating pressure the penstock door is provided with an roller system. Therefore the operation is very easy. The guide's design enables a lifting of the door to reduce the frictional resistance. So it is less forces for the opening required. You can vary the closing pressure of the door by means of the continuously adjustable system of wedges. That is why you are able to adjust the penstock to off-seating pressure without any problems.

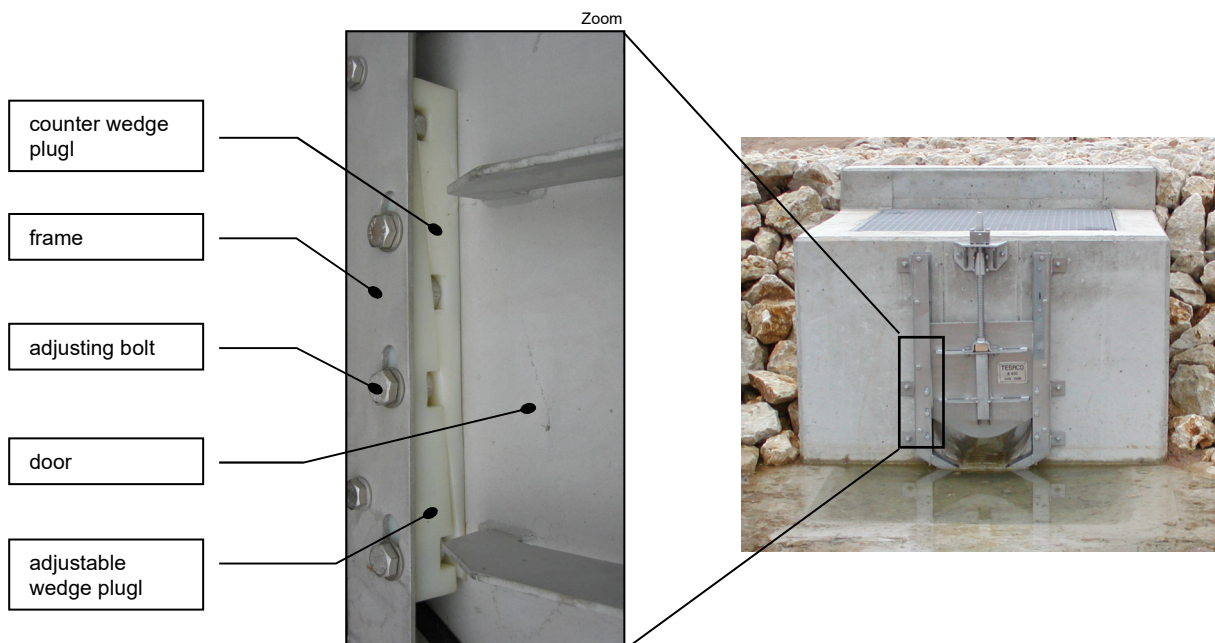


Fig. 5 - Wedging system

Spindle nut:

Each door is operated via a spindle nut made of zinc free bronze. Its wastewater resistant trapezoidal thread provides an easy operation even under a high concentration of sludge and trash.

Spindle and drive rod:

The spindles are made of stainless steel AISI 316. They have a trapezoidal thread conforming with the spindle nut.

Guides are required in relation to the extension length. They prevent a bending of the spindles or rods. The guides are equipped with adjustable range spacers to compensate irregularities of the wall.

Corrosion protection:

All stainless steel parts are pickled and passivated.

Static and Operating heads for penstocks:

Standard:	6 m/WC*	Static head
	6 m/WC*	Operating head
Special design:	20 m/WC*	Static head (max. 20 m/WC)
	20 m/WC*	Operating head (max. 20 m WC)

* m / WC = Head in meter water column on-and off seating

Operating equipment:

Depending from the requirements there are various types of different penstock drives available. Generally the operating equipment is located either above floor level or below floor level. Additionally the penstock could be operated manually or by power operation (electric or pneumatic/hydraulic).

Please refer to our catalogue part "D".